



Nutritional Supplements: Pushing the Limits

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Objectives

- ✍ Discuss government labeling law
- ✍ Review herbs, ergogenic aids and other supplements
- ✍ Safety guidelines

BCAAs
OMEGA-3s
CHONDROITIN
GLUCOSAMINE

**MULTI-
VITAMIN/
MINERAL
COMPLEX**

**ANTI-
OXIDANTS***
C & E
LYCOPENE
BETA-CAROTENE
ALA Q₁₀
N-ACETYLCYSTEINE

CREATINE

GLUTAMINE

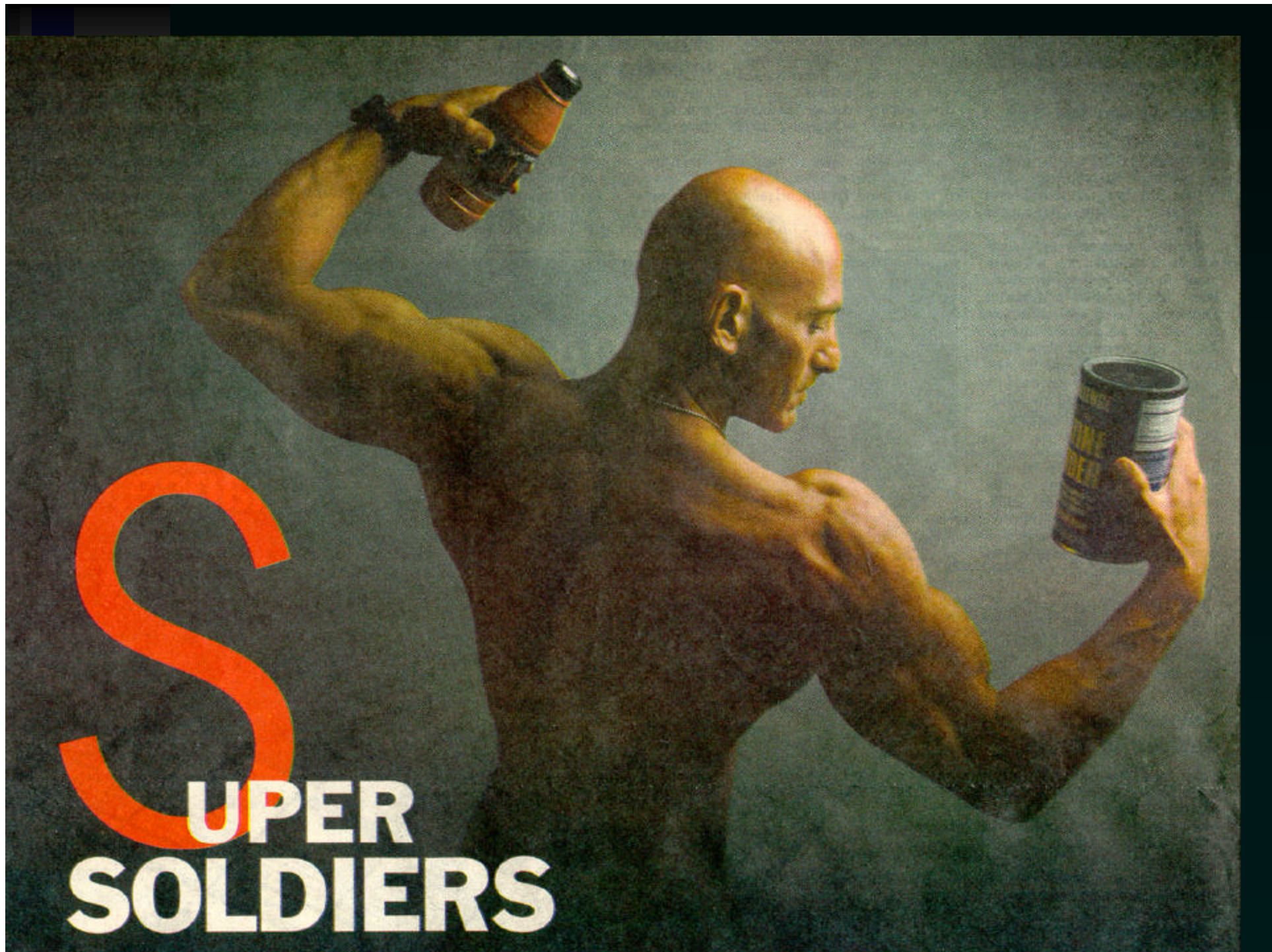
PROTEIN SUPPLEMENTS
WHEY • CASEIN • SOY

*Only selected antioxidants could be listed here.

Pushing the Limits

50% of elite-level athletes are willing to take a substance that would guarantee them an Olympic gold medal, even if they knew that taking the substance would be fatal within a year.

(The Ergogenics Edge, Melvin Williams, 1998)



S UPER SOLDIERS

Energy Bar

270 calories
48 g carbohydrate
3 g protein
8 g fat

75 mg sodium
70 mg potassium

% Daily Value:
35% Vitamin C
50% Vitamin E
20% B vitamins
50% folic acid



Sports Drink

170 calories
43 g carbohydrate
0 g protein
0 g fat
20 mg sodium

% Daily Value:
50% Vitamin C



Dietary Supplement Health And Education Act of 1994

- ✗ Recognizes dietary supplements as separate from food and drugs
- ✗ Ingredients are not approved by FDA
- ✗ Lack of reliable information
- ✗ Claims are questionable
 - Cannot make a claim that it treats, cures, or prevents disease

FDA's Dangerous Herbs

- ✂ Chaparral: liver disease
- ✂ Comfrey: ingestion is toxic
- ✂ Yohimbe: paralysis
- ✂ Lobelia: possible death
- ✂ Willow Bark: Reye syndrome
- ✂ Ephedra

Ephedra (Ma Huang)

✍ A Chinese herb



- Found in 100's of weight loss/energy products

✍ Claim: stimulates the CNS, suppresses appetite, acts as a decongestant, asthma reliever, ergogenic aid

✍ Side Effects: dizziness, jitters, insomnia, heart palpitations, ? BP and heart rate

Ephedra

Warning:

- Banned by NCAA and several states
 - > 40 deaths and > 800 adverse reactions
 - Dangerous for those with heart conditions, high blood pressure, thyroid condition, history of kidney stones
-  FDA warns not to take > 24 mg/day
-  Caffeine exacerbates the effects

BATTLE of the FAT-BURNERS

"The Stack" - Advertised as
potent thermogenic fat burner

Ephedra
Caffeine
Aspirin



Ephedra
Guarana
Willow bark

**Forget the six pack.
Go for the whole case.**



FDA's Most Dangerous List

 TRIAC

(triiodothyroacetic acid = tiratricol)

 L-tryptophan

 Dieter's Tea

 GBL (gamma butyrolactone)

St. John's Wort

- ✍ Used in Europe to treat depression
- ✍ Used in conjunction with Ephedra: Herbal Phen-Fen, Diet-Phen, Herbal Phen Fuel
- ✍ Claim: boosts mood, suppresses appetite, improves wound healing when applied topically

St. John's Wort

✍ Side Effects: GI irritation, sensitivity to sun, fatigue, dizziness, itching

✍ Safe Dosage:

- 300 mg of extract (0.3% hypericum) 3 times per day for 6 weeks
- Dose as a tea varies; 1-2 cups for 4-6 weeks

✍ Is it as effective as prescription antidepressants?

Ginkgo Biloba

✍ Ginkgo leaf extracts

✍ Claim: memory booster, improves blood flow, treatment for asthma, decongestant


✍ Side Effects: nausea, headache, rash, dizziness

Ginkgo Biloba

Safe Dosage:

- 120 - 180 mg/day; take consistently for 12 weeks to see benefits
- Tea is probably ineffective

Warning: discuss with doctor

- caution with blood thinners (Coumadin), vitamin E, omega-3 fatty acids, aspirin
-  May see subtle changes for dementia / Alzheimer's patients




Ginseng

✍ Extract of ginseng root.

✍ Claim: protection against tissue damage,
? energy, ? sex drive

✍ Side Effects: headache, insomnia, rash,
anxiety, diarrhea; severe effects are rare

Ginseng

 Safe Dosage: 200 - 250 mg/day

- 100 - 125 mg ginseng extract standardized to contain 4 - 7% ginsenosides

 Warning:

- persons with high blood pressure should not take ginseng
- not all supplements contain the same amount of root extract, nor is it always pure root

Echinacea

✍ "cold fighting" herb


✍ Claim: an immune booster, prevents and relieves cold and flu symptoms; used topically to heal wounds

✍ Side Effects: short-term fever, nausea, vomiting

Echinacea

Safe Dosage:

- not to be used everyday
- 250 mg (standardized to contain 4% echinoside) every 6 hours for 2 days at initial onset of symptoms

 Warning: may be contraindicated in those with lupus, HIV, or multiple sclerosis

DHEA

- ✍ Hormone produced in body (dehydroepiandrosterone); ? with age
- ✍ Claim: boosts the immune system, slows aging, cure-all for everything from impotence to cancer
- ✍ Side Effects: acne, insomnia, ? heart rate, ? heart palpitations; ? HDL cholesterol; ? level of testosterone; high doses can ? facial hair in women

DHEA

- ✍ Warning: OTC strength and purity not regulated; untested in long-term clinical trials
- ✍ Supplementation may be okay for those diagnosed with DHEA deficiency; take under the care of doctor
- ✍ Not recommended by the National Institute of Aging



Glucosamine

- ✍ Molecule produced by the body to build cartilage
- ✍ Claim: ? pain for osteoarthritis by building more cartilage; is not a cure
- ✍ Side Effects: minimal if any; many supplements sold without actually containing glucosamine

Glucosamine

- ✍ 500 mg glucosamine 3X/day vs. 400 mg ibuprofen 3X/day
 - more effective than placebo
 - as effective as ibuprofen
- ✍ Slower than ibuprofen; ? GI side effects
- ✍ Not everyone benefits; stop taking if no improvement within 4 weeks
- ✍ No long term research

Chondroitin

- ✍ Molecule produced by the body to build cartilage; ? elasticity
- ✍ Claim: helps relieve arthritic pain by increasing cartilage in joints; may slow down cartilage breakdown
- ✍ Side Effects: minimal, if any

Chondroitin

- ✍ Research shows 1200 mg/day as effective as pain reliever
- ✍ Minimal research on chondroitin plus glucosamine
- ✍ Question quality and quantity
- ✍ Chondroitin from shark cartilage is cheaper; no guarantee on amount

Chromium

- ✍ Essential trace mineral needed by body
- ✍ Claim: ? muscle mass, ? body fat, alternative to steroids, helps maintain normal blood sugar levels
- ✍ Side Effects: megadoses may lead to zinc and iron deficiencies

Chromium

 Food Sources: asparagus, mushrooms, prunes, brewer's yeast, beer, egg yolks, wheat germ

 Dosage:

- Estimated Safe and Adequate Daily Dietary Intake (ESADDI): 50 - 200 mcg/day

 Research suggests supplementation most effective for diabetics or those with deficiency


Amino Acids

 Protein → Amino Acids

 Claim: repair and build muscle, ? strength

 Facts:

- Exercise / strength training increases muscle
- Amount in pills / powders less than food
- Excess protein stored as fat

 Side Effects: ? risk for dehydration,
? stress on kidneys

Amino Acids: Supplements vs. Food

| | <u>Valine</u> | <u>Leucine</u> | <u>Isoleucine</u> |
|--------------------|---------------|----------------|-------------------|
| 2 amino acid pills | 200 | 280 | 175 |
| 1 cup macaroni | 290 | 450 | 250 |
| 8 oz skim milk | 550 | 800 | 500 |
| 3 1/2 oz tuna | 1300 | 1920 | 1200 |

Creatine

- ✍ Natural substance found in fish and meat
- ✍ Made in body and stored in muscles
- ✍ Claim: ? energy and muscular strength, burns fat, improves endurance, delays fatigue
- ✍ Side Effects: weight gain, muscle cramping, nausea, diarrhea, kidney problems?

Creatine

Research:

- Improves anaerobic activities
- No effect on aerobic activities
- Excess is excreted
- Vegetarians demonstrate greater uptake
- Not studied long term

Dosage

- Rapid loading: 20 - 25 g/day for 5 - 7 days
- Slow loading: 3 g/day for 30 days
- Maintenance: 2 g/day

Androstenedione

- ✍ Anabolic steroid produced by body
- ✍ Claim: ? strength, ? testosterone levels
- ✍ Side Effects: acne, ? aggressiveness, ? LDL, ? HDL, ? sperm production, stroke, heart attack, heart muscle damage
 - teens: stunted growth
- ✍ Limited research

Supplement Safety Tips

- ✍ Do your research!
- ✍ Buy nationally known brands
- ✍ Start with a small dose; be alert to side effects
- ✍ Use single herbal supplements
- ✍ Don't give herbs/supplements to children

Supplement Safety Tips

- ✍ Don't take herbs/supplements if pregnant or breastfeeding (except if prescribed by M.D.)
- ✍ Take herbs and prescribed drugs at different times
- ✍ Stop taking before surgery
- ✍ Always tell your health care provider what you are taking

Adverse Reactions

- ✍ To report an adverse side effect from dietary supplements or herbs:
- ✍ FDA MedWatch: 1-800-332-1088
- ✍ www.fda.gov/medwatch

Web Sites

 Food and Drug Administration

<http://www.cfsan.fda.gov/~dms/supplmnt.html>

 US Air Force USAFSAM/AF

<http://www.brooks.af.mil/web/af/altmed/HOMEFRAME.htm>

 U.S. Uniformed Health Services

<http://www.usuhs.mil/mim/hpl.html>

- “Nutritional Ergogenic Agents”
- “Navy Seal Nutrition Guide” & “Navy Seal Physical Fitness Guide”